REMARKS

Please consider the following comments. After the foregoing amendments, claims 8 and 11-14 are pending in the application for consideration by the Examiner. Applicants respectfully request reconsideration and allowance of this application in view of the foregoing amendments and the following remarks.

Telephone Interview

Applicants desire to express thanks to Examiner Peter F. Godenschwager for the courtesies extended the undersigned in a telephone interview on July 28, 2010. During the interview, Applicants mainly discussed the teachings of Vercammen (US 7,279,089) and the combination of these teachings with those of Braden (US 5,965,785). At the interview, Applicants also provided a Combination of Tables, which is based on the data in the present specification. A copy of the Combination of Tables is attached to the end of this response. The remarks presented by the Applicants during the interview are included below.

Claims 5 and 15 Rejection – 35 U.S.C. §103

The Examiner rejected claims 5 and 15 under 35 U.S.C. §103(a) over Taya (US 5,026,523) in view of Vercammen. In the foregoing amendments, Applicants canceled claims 5 and 15 from the application. Accordingly, this rejection is now moot.

Claims 8 and 11 – 14 Rejections – 35 U.S.C. §103

The Examiner set forth two rejections of these claims. The Examiner rejected claims 8 and 16 under 35 U.S.C. §103(a) over Braden in view of Vercammen. In the foregoing amendments, Applicants inserted the limitations of claim 16 into claim 8 and canceled claim 16. In addition, the Examiner rejected claims 11 – 14 under 35 U.S.C. §103(a) over Braden in view of Vercammen. In summary, claims 8 and 11 – 14 Stan rejected under 35 U.S.C. §103(a) over Braden and Vercammen

The Examiner took the position that Braden teaches a process of adding an amine to a liquid that contacts an atmospheric distillation column to prevent/inhibit corrosion. Among other things, the Examiner acknowledged that Braden does not disclose or suggest use of the presently claimed (β-hydroxyethyl) trimethylammonium hydroxide [choline]. However, the Examiner took the position that a person of ordinary skill in the art would have found it obvious to use the choline of Vercammen in the process of Braden. The Examiner continued while neither Braden nor Vercammen explicitly teach a method of preventing formation of hydrogen chloride, the references render obvious all the claimed ingredients, process steps, and process conditions. Applicants respectfully traverse these rejections for the following reasons.

Applicants' claim 8 recites a method for preventing corrosion of metal in an atmospheric distillation column for petroleum refining process, which comprises, *inter alia*, adding only the (β-hydroxyethyl) trimethylammonium hydroxide [choline] to fluid containing water, *thereby reacting the (β-hydroxyethyl) trimethylammonium hydroxide [choline] with magnesium chloride and calcium chloride contained within the fluid to produce (β-hydroxyethyl) trimethylammonium*

hydrochloride [choline chloride] and preventing corrosion of the metal and formation of hydrogen chloride.

Applicants' claim 11 recites a method for inhibiting formation of hydrogen chloride in a crude oil atmospheric distillation unit, which comprises, *inter alia*, adding only the (β-hydroxyethyl) trimethylammonium hydroxide [choline] to the desalted crude oil in between a crude oil desalter and a main distillation column in the crude oil atmospheric distillation unit, *thereby reacting the (β-hydroxyethyl) trimethylammonium hydroxide [choline] with magnesium chloride and calcium chloride contained within the desalted crude oil to produce (β-hydroxyethyl) trimethylammonium hydrochloride [choline chloride] and preventing corrosion of the metal and formation of hydrogen chloride.*

Applicants respectfully submit that the inventions defined in claims 8 and 11 are patently distinguishable from the teachings of Braden and Vercammen. Most importantly, the teachings of Braden and Vercammen do not disclose or suggest use of choline for directly reacting with magnesium chloride and calcium chloride, which is contained within the fluid containing water that contacts the inside of the atmospheric distillation column or the desalted crude oil, to produce choline chloride as presently claimed.

During the telephone interview, the Applicants explained that the data in the Specification demonstrates the unexpected advantages of using choline in the presently claimed invention as opposed to other amines. The Applicants also commented that the Examiner may be reading too much into the teachings of Vercammen. For example, when discussing the data in the Specification, the Examiner stated that Table 2 of the Specification compares choline, a strong base, to four weak bases, and their ability to raise the pH of an aqueous solution (Off. Act.

p. 8, ll. 4-8). The Examiner continued that it would not be unexpected to one of ordinary skill in the art that a strong base will raise the pH of an aqueous solution more than a weak base. From this, the Examiner took the position that there was a direct relationship between the strength of the base and the amount the base will raise the pH.

In the Combination of Tables attached to the end of this amendment, the bases are arranged from Table 2 from strongest (choline) to weakest (morpholine). If the Examiner's position was correct, the ratio (amount) of the cyclohexylamine, monoethanolamine, ammonia, and morpholine added to obtain the same pH as choline would increase for each of the bases from cyclohexylamine to morpholine (as you move down the table). However, the Combination of Tables demonstrates that the bases do not follow this pattern. For example, more cyclohexylamine is required than monoethanolamine to obtain the same pH (10.0, 10.5, or 11.0), but cyclohexylamine is a stronger base than monoethanolamine. This is in contrast to the Examiner's reasoning, where less cyclohexylamine should be required compared to monoethanolamine.

When the above was explained to the Examiner during the previously mentioned telephone interview, he agreed that the data in Table 2 shows something more than simply the addition of a stronger base is acting here. He also agreed that this could be an indication of unexpected advantages. Applicants respectfully submit that the data in the attached Combination of Tables demonstrates the unexpected advantages of the presently claimed inventions by showing that choline unexpectedly decreases corrosion speed (Table 3) and chloride ion concentration (Table 5) compared to other amines, such as those proposed by Braden.

The presently claimed invention and Vercammen are concerned with different reactants. While Vercammen is concerned with preventing fouling and corrosion caused by ammonium chloride and ammonium sulfates, the presently claimed invention is concerned with preventing the formation of hydrogen chloride. For example, the teachings of Vercammen describe that ammonium chloride and ammonium sulfates generated through the crude oil refinery process therein were are imported from other units with the feedstock (such as addition of ammonium for neutralization) (col. 1, ll. 14-17). Accordingly, Vercammen teaches the use of choline only for converting the ammonium chloride and ammonium sulfate to compounds that do not foul the oil refinery apparatus. In other words, the use of choline in Vercammen is intended for mitigating the presence of ammonium chloride and ammonium sulfates in the oil refinery process to prevent corrosion of the apparatus therein by converting the ammonium chloride and ammonium sulfates to other compounds.

In contrast to the teachings of Vercammen, the presently claimed inventions do NOT require or inhibit the presence of ammonium chloride or ammonium sulfate, but rather, prevent corrosion of metal by inhibiting the formation of hydrogen chloride. The presently claimed invention and the teachings of Vercammen are directed to different reactions. In the presently claimed inventions, choline directly reacts with magnesium chloride and calcium chloride contained within the fluid of the system to produce choline chloride. Accordingly, the use of choline in the presently claimed invention does not require ammonium for neutralization or require or inhibit the presence of ammonium chloride and ammonium sulfate as required in Vercammen, while directly preventing the formation of hydrogen chloride derived from the magnesium chloride and calcium chloride contained in the system. In other words, the behavior

of choline in the presently claimed inventions is not the same as that in Vercammen. Therefore, the teachings of Vercammen, either alone or in combination with the teachings of Braden, cannot lead one of ordinary skill in the art to the inventions recited in Applicants' claims 8 and 11.

At least for the foregoing reasons, Applicants respectfully submit that the inventions defined in present claims 8 and 11 are patently distinguishable from the combination of Vercammen and Braden. Claims 12 – 14 depend from claim 11 and are patently distinguishable from the combination of Vercammen and Braden for the same reasons as those discussed above concerning claim 11.

Conclusion

Applicants respectfully submit that, as described above, the cited prior art does not show or suggest the combination of features recited in the claims. Applicants do not concede that the cited prior art shows any of the elements recited in the claims. However, Applicants have provided specific examples of elements in the claims that are clearly not present in the cited prior art.

In view of the foregoing, the Applicants respectfully submit that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the Examiner is invited to contact the undersigned by telephone.

Please charge any unforeseen fees that may be due to Deposit Account No. 50-1147.

Respectfully submitted,

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Attachment: Combination of Tables 1, 2, 3, & 5

	Table 1	Table 2			Table 3	Table 5
		Boiler Water pH (25 °C)				
Base	Kb Value (25 °C)	10.0	10.5	11.0	Corrosion Speed (mdd)	Chloride ion Concentration (mg/L)
Choline	3.14×10^{-3}	1.0	1.0	1.0	32	2.8
Cyclohexylamine	3.39×10^{-4}	20.3	28.0	44.8	—	—
Monoethanolamine	3.15×10^{-5}	1.8	6.3	11.3	132	140
Ammonia	1.82×10^{-5}	7.8	21.1	49.9	256	—
Morpholine	2.09×10^{-6}	53.0	159.1	424.2	—	—
3-methylpropylamine	—	—			480	—
Dimethylethanolamine	—	—			288	140
Sodium Hydroxide	—	—			—	5.4
None	—	—			—	110